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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Juzer Jangbarwala
Appl. No.:	10/009,710
Filed:	November 28, 2001
Docket No.:	1688
Title:	**ELECTROWINNING CELL INCORPORATING METAL ION FILTRATION APPARATUS**
Art Unit:	1742
Examiner:	Donald R. Valentine
Action:	***DECLARATION UNDER 37 C.F.R. §1.131***
Date:	March 30, 2004

TO: Mail Stop Fee Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

DECLARATION OF JUZER JANGBARWALA

Juzer Jangbarwala hereby declares as follows:

1. My name is Juzer Jangbarwala, and I am the named inventor of the above-identified patent application, and I am making this declaration in support thereof.

2. The above-identified application was filed as a 35 U.S.C 371 of PCT/US00/14615, which claims the benefit of U.S. Patent Application No. 09/322,745 entitled Electrowinning Cell Incorporating Metal Ion Filtration Apparatus, which was filed May 28, 1999.

3. The present application contains claims 1-34. It is my understanding that the Examiner has indicated that claims 4, 8, 12, 13, 15, 21, 25, 30, and 33-34 contain allowable subject matter while each of the other claims were rejected under

35 U.S.C. § 102(e) based upon the teachings of United States Patent No. 6,156,186 to Mueller et al.

5. It is my understanding that Mueller et al. has a filing date of October 30, 1998. It is also my understanding that Mueller et al. claims priority through eight (8) provisional applications. Specifically, I understand that Mueller et al. claims priority through the following eight provisional applications:

1. App. No. 60/064,284 – filed October 30, 1997
2. App. No. 60/064,279 – filed October 30, 1997
3. App. No. 60/077,428 – filed March 9, 1998
4. App. No. 60/077,878 – filed March 13, 1998
5. App. No. 60/099,717 – filed September 10, 1998
6. App. No. 60/100,494 – filed September 16, 1998
7. App. No. 60/100,497 – filed September 16, 1998
8. App. No. 60/100,510 – filed September 16, 1998

6. I invented the subject matter disclosed and claimed in my above-identified patent application in the United States prior to the October 30, 1998 filing date of Mueller et al. Additionally, I invented the subject matter disclosed and claimed in my above-identified patent application in the United States prior to the effective date of Mueller et al. with respect to at least that subject matter disclosed in the provisional applications identified as numbers 3 through 8, above. In particular, I invented an apparatus having the various features that are described and claimed in my application at least as early as February 1998. I do not believe the provisional applications identified as numbers 1 and 2, above (App. Nos. 60/064,284 and 60/064,279, filed October 30, 1997) fully disclose my claimed invention.

7. Sometime during the month of January 1998, I recall being approached by Anthony Edwards, Glenn Heiney, and John Rader at Packard Hughes Interconnect Wiring Services ("Packard Hughes"), which is located in Irvine,

California. Packard Hughes was interested in acquiring a recycling system that would function to remove copper, lead, tin, and nickel from waste-water.

8. At the time I was approached by Packard Hughes, I held the position of President and Chief Technology Officer at Hydromatix, Inc., which was a manufacturer of liquid purification systems[1]. To meet the needs of Packard Hughes, I proposed a recycling system, which incorporated a conventional electrowinning cell unit that generally consisted of a collection tank, an anode, a cathode, and a direct current (DC) power source. I also provided detailed costs analyses for operating the unit.

9. During that January 1998 meeting, Packard Hughes declined the sale of the recycling system because they were not satisfied with the high costs associated with operating the conventional electrowinning unit, nor where they satisfied by low efficiency of the unit. Furthermore, the unit greatly exceeded their space requirements.

10. Eager to satisfy Packard Hughes's needs, I inquired as to whether the company would be interested in having me investigate ways to modify the recycling system to increase the efficiency of the electrowinning unit thereby to reduce the size and associated operating costs of the system. Packard Hughes expressed great interest in my proposal, and I began thinking of ways to modify the system.

11. Beginning in early February 1998, I began thinking of ways to increase the efficiency of a conventional electrowinning cell. Since high metal concentration is a critical component of efficient electrowinning systems, I began exploring ways to keep the concentration of metals high at the cathode interface. Particularly, I was

[1] BOC Edwards acquired Hydromatix, Inc. and is now operating under the name BOC Edwards-Hydromatix.

interested in maintaining a high concentration of metal ions not only in the beginning stages of electrowinning, but also in the later stages so that the electrowinning cell could operate at peak efficiency at all times.

12. During the month of February 1998, I contemplated using nanofiltration technology in conjunction with an electrowinning cell to improve the concentration of metal ions in the solution. I believed that if a nanofilter could somehow concentrate the metal ions in the solution and return the concentrated solution to the cathode, there may be a potential of increasing the overall concentration of the metal ions at the cathode.

13. I recall having several conversations with Norm Volle in February 1998 related to the use of a nanofilter in conjunction with the electrowinning cell. I also recall showing Mr. Volle drawings of my idea.

14. By the end of February, I became increasingly interested in the potential of nanofiltration technology to improve the efficiency of an electrowinning cell. I had a CAD diagram, drawn by my employees at my direction, of a possible recycling system that would meet the needs of Packard Hughes, which employed an electrowinning cell in use with a nanofilter. A true and correct copy of that diagram, which is dated February 22, 1998, is attached hereto as Exhibit A.[2]

15. Exhibit A shows an initial version of the system that I believed had potential for meeting the needs of Packard Hughes. As shown in the drawing, the recycling system employs an electrowinning unit, which broadly includes a reservoir, an anode and a cathode disposed in the reservoir, in fluid communication with T-11 – COPPER BEARING DRAGOUT HOLDING TANK, which is a solution holding tank

[2] The CAD drawing in Exhibit A was for my use and the use of my company as I developed this project and was not used as a proposal to Packard Hughes.

adapted to receive a solution containing metal ions. There is a first circulating loop between T-11 and the electrowinning unit. Particularly, the solution containing metal ions is drawn from T-11 into the electrowinning unit through outlet 73 via a conduit and enters the electrowinning unit via inlet 73_A. In the electrowinning unit, metal ions are deposited on the cathode and the solution exits the electrowinning unit through outlet 71_A and returns to T-11 via a conduit through inlet 71. In this initial version, a timer was used to initiate a different circulating loop, which draws solution out of T-11 and through the nanofilter. Particularly, at a selected stage of the electrowinning process, a second circulation loop would be initialized whereby the solution containing metal ions is drawn from T-11 through outlet 74 and enters the nanofilter via inlet 74_A. The nanofilter separates the incoming solution containing metal ions into a retentate and a permeate. The retentate, having a first concentration of metal ions, would leave the nanofilter from outlet 72_A and return to T-11 via inlet 72 where it could then be drawn into the electrowinning cell. The permeate, having a second concentration of metal ions lower than the first concentration, would pass through the nanofilter and leave the nanofilter via outlet 75_A and enter into T-12 NANOFILTER HOLDING TANK where it may be sent to waste, wherein any remaining metal ions may be recovered, if desired, by additional processes such as by further filtration or by secondary methods known in the art.

16. While realizing that employing a nanofilter could have great potential to increase the efficiency of the electrowinning unit, I wanted to do additional research to be sure of its capabilities. Accordingly, during the months of March and April 1998, I researched other uses of the nanofiltration technology and spoke with various individuals having expertise in crossflow membrane applications to assure

myself that the efficiency of the electrowinning unit would increase if used in conjunction with a nanofilter.

17. During March and April of 1998, I researched nanofiltration technology on the Internet. I also researched the mining industry, which was using nanofiltration to concentrate copper sulfate from acid leaching solutions primarily to decrease the flow rate into the precipitation system for copper hydroxide.

18. In addition to my research, I had multiple discussions with Mr. Volle regarding the potential of using nanofilters during the months of March and April 1998. Particularly, I recall discussing with Mr. Volle the possibility of using the nanofilter to concentrate copper sulfuric acid and the effect upon the electrowinning cell due to an increase in temperature of the copper sulfuric acid due to recirculation.

19. Further, during the months of March and April 1998, I met with experts in the field of crossflow membranes in the nanofiltration range. Particularly, I recall meeting with Larry Lein, who is an application's specialist for a Desal™ proprietary membrane product manufactured by Osmonics, 760 Shadowridge Dr., Vista, CA 92083-7986. I also corresponded with Tom Baker who is employed by a German company, Heraeus Elektrochemie, which has an office in New Jersey.

20. After thoroughly researching nanofiltration technology, and speaking with various individuals in this field such as Larry Lien, I concluded that a nanofilter, used in conjunction with an electrowinning cell, would increase the efficiency of electrowinning and could be incorporated into a recycling system that would meet the needs of Packard Hughes. To the best of my recollection, I arrived at this conclusion sometime in May 1998.

21. Accordingly, by May 29, 1998, I instructed my employees to prepare a CAD drawing of the recycling system I designed to propose to Packard Hughes. A

true and correct copy of the CAD drawing that was prepared for my meeting with Packard Hughes is attached hereto as Exhibit B.

22. As shown in Exhibit B, the recycling system employs an electrowinning unit, which broadly includes a reservoir, an anode and a cathode disposed in the reservoir, in fluid communication with T-11, which is a solution holding tank adapted to receive a solution containing metal ions. There is a first circulating loop between T-11 and the electrowinning chamber. Particularly, the solution containing metal ions is pumped from T-11 into the electrowinning chamber via a conduit. In the electrowinning chamber, metal ions are deposited on the cathode and the solution exits the electrowinning chamber and is returned to T-11 through a second conduit. At a selected time in the electrowinning process, the solution containing metal ions is drawn from T-11 and into the nanofilter (which is marked in the drawing as NF). The nanofilter separates the incoming solution containing metal ions into a retentate and a permeate. As shown, the retentate, having a first concentration of metal ions, leaves the nanofilter and return to T-11 where it can then be drawn into the electrowinning cell. The permeate, having a second concentration of metal ions lower than the first concentration, passes through the nanofilter leaves the nanofilter and enters T-12 where it may be sent to waste, wherein any remaining metal ions may be recovered, if desired, by additional processes such as by further filtration or by secondary methods known in the art.

23. Generally speaking, the method associated with the apparatus shown in Exhibit B comprises the steps of drawing a portion of a solution containing metal ions from a region proximate to a cathode in an electrochemical cell, filtering the portion of the solution thereby to create a retentate and a permeate and returning the retentate to the electrochemical cell. The retentate has a first concentration of metal

ions and the permeate has a second concentration of metal ions lower than the first concentration. Additionally, the apparatus broadly relates to a system for reducing metal ions in a solution to their corresponding elementary metals. The system comprises a fluid source, a reservoir, an anode and cathode disposed in the reservoir, a power source, a filter including a membrane, a retentate and a permeate, and a return means. The fluid source is operative to provide a solution containing metal ions at a selected concentration. The reservoir is in fluid communication with the fluid source and operative to receive the solution. The power source supplies electric current to the anode and the cathode. The filter has a first region on one side of the membrane and a second region on an opposite side of the membrane. The retentate, which has a first concentration of metal ions, is disposed in the first region of the filter. The permeate, which has a second concentration of metal ions lower than the first concentration, is disposed in the second region of the filter. Finally, the return means returns the retentate to the reservoir.

23. By May 29, 1998 various other features contemplated for use with the apparatus included an agitator in fluid communication with said reservoir, or disposed in the reservoir that may include fluidized bed of glass beads. Alternatively, the agitator could include a motor which engages the cathode and is operative to rotate the cathode about a longitudinal axis thereof.

24. Shortly after the CAD drawing was completed, I proposed the recycling system to Packard Hughes. To the best of my recollection, my meeting with Packard Hughes took place by early June 1998.

25. Packard Hughes considered the proposal, and, to the best of my recollection, accepted the proposal sometime in late June or July 1998.

26. After the proposal was accepted, various design changes were made which included changes in the dimensions and placement of equipment to both satisfy the space requirements of Packard Hughes as well as in response to the Environmental Health & Safety audit, which had been conducted. To the best of my recollection, the construction of the recycling system began sometime in either October or November 1998.

27. In further support of this declaration, I am attaching hereto Exhibits C a supporting declaration of Norman Volle, who is currently the President of BEWT Systems, Inc. Mr. Volle declares that we discussed various features of the recycling system that was ultimately proposed to Packard Hughes between the months of February and June of 1998.

28. I, the undersigned, being hereby warned that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon, declare that the facts set forth in this declaration are true, all statements made of my own knowledge are true, and all statements made on information and belief are believed to be true.

Further declarant sayeth not.

Date: 3/30/04 By: Juzer Jangbarwala

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Juzer Jangbarwala
Appl. No.: 10/009,710
Filed: November 28, 2001
Docket No.: 1688
Conf. No. 4730
Title: **ELECTROWINNING CELL INCORPORATING METAL ION FILTRATION APPARATUS**

Art Unit: 1742
Examiner: Donald R. Valentine

Action: ***SUPPORTING DECLARATION***
Date: March 30, 2004

TO: Mail Stop Fee Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

DECLARATION OF NORMAN VOLLE

Norman Volle hereby declares as follows:

1. My name is Norman Volle. I am currently the President of BEWT Systems, located in Ballwin, Missouri. I have been involved in the field of metal recovery by electrowinning for approximately seven (7) years and in the field of metal finishing for approximately forty-five (45) years.

2. I am making this declaration on behalf of Juzer Jangbarwala in regard to the above-identified patent application.

3. It is my understanding that the Examiner has rejected certain claims of this patent application based upon the teachings of United States Patent No. 6,156,186 to Mueller et al. It is my understanding that Mueller et al. has a filing

date of October 30, 1998 and claims priority through eight (8) provisional applications. Specifically, I understand that Mueller et al. claims priority through the following eight provisional applications:

1. App. No. 60/064,284 – filed October 30, 1997
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5. App. No. 60/099,717 – filed September 10, 1998
6. App. No. 60/100,494 – filed September 16, 1998
7. App. No. 60/100,497 – filed September 16, 1998
8. App. No. 60/100,510 – filed September 16, 1998

4. I understand that this declaration is going to be used by Juzer Jangbarwala in support of his position that he invented an apparatus having the various features that are described and claimed in the application at least as early as February 1998.

5. Sometime during January or February 1998, I recall that Mr. Jangbarwala contacted me to discuss designing a recycling system for a potential customer. Mr. Jangbarwala informed me that he needed to design a system that utilized an more efficient electrowinning cell to reduce the size requirements of the system as well as the associated operating costs to meet the needs of the customer.

6. To the best of my recollection, Mr. Jangbarwala and I discussed using a nanofilter in conjunction with an electrowinning cell in February 1998. More particularly, we discussed using nanofilter to improve the concentration of metal at the cathode interface.

7. Based upon my knowledge and experience in this industry, I was quite confident that Mr. Jangbarwala's decision to use a nanofilter, in the way he

presented it to me in February 1998, would indeed create a more efficient electrowinning cell. Particularly, based upon Mr. Jangbarwala's drawings and our related conversations, I believed that the nanofilter would be able to be employed so as to concentrate the metal ions in the solution and return the concentrated solution to the cathode to effectively increase the efficiency of the electrowinning cell.

8. I recall having numerous meetings with Mr. Jangbarwala between March 1998 and June 1998 regarding the recycling system that Mr. Jangbarwala was designing for his customer. I recall flying to California several times to meet with him to discuss various details relating to the project. Particularly, I recall that during this timeframe, Mr. Jangbarwala was gathering information regarding the use of the nanofilter in conjunction with the electrowinning cell to further satisfy himself that the efficiency of the electrowinning cell would be greatly improved thereby and that his customer's needs would be met.

9. I, the undersigned, being hereby warned that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon, declare that the facts set forth in this declaration are true, all statements made of my own knowledge are true, and all statements made on information and belief are believed to be true.

Further declarant sayeth not.

Date: April 7, 2004 By: _____

Norman Volle